Case Report

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Abdominal cutaneous nerve entrapment syndrome following totally extraperitoneal inguinal hernia repair in a professional soccer player

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Abstract

This case report describes a case of persistent abdominal wall pain following totally extraperitoneal inguinal hernia repair. The patient is a high-profile soccer player. The pain was undulant, imaging studies did not reveal any specific reason, and conservative treatments failed throughout a year. Surgical exploration revealed abdominal cutaneous nerve entrapment syndrome (ACNES) due to compression of fibrotic scar tissue around the suture material used for fascial closure. Surgical neurectomy provided relief of the pain. ACNES should be included within the possible causes of persistent pain after laparoscopic procedures such as inguinal hernia repairs. Lateral port entries over the rectus muscle sheath carries this risk. Chronic pain in the patient can be treated surgically with excision of the involved nerve.

Keywords:

ACNES, chronic pain, inguinal hernia, sportsman hernia, TEP

Introduction

Chronic postoperative inguinal pain (CPIP) is a rather common problem following inguinal hernia repairs.[1] It can be seen after either open or minimally invasive repairs; however, the risk is lower for the latter techniques. The mechanism of CPIP is complex, and diagnosis and treatment are often challenging.[2]

Long-standing inguinal pain in athletes is also a complex problem. Several pathologies might cause pain, and several terms such as sportsmen hernia (athletic pubalgia and groin pain syndrome) have been used for this condition.[3] Campanelli recommended pubic inguinal pain syndrome (PIPS) as a more accurate term.[4] This form of inguinal pain can be managed by team effort with different modalities including sports medicine, orthopedics, physical therapy, and algology, and an inguinal hernia repair is required eventually in some instances. A vast majority of the athletes who undergo hernia surgery have their previous sports capacity restored, and most of them achieve it 5–6 weeks following hernia repair.[5,6] However, pain may resist after surgery, and the player cannot restore the full capacity. In this situation, the underlying causes are usually osteitis pubis or adductor tendinitis, but problems related to hernia surgery can also can be the cause. Incriminating factors for continuing pain following inguinal hernia repair for athletic pubalgia are mesh- or fixation-related problems.

In this editorial that is based on a case report, we present a rare cause of chronic pain in a professional soccer following totally extraperitoneal (TEP) inguinal hernia

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repair, which is known as abdominal cutaneous nerve entrapment syndrome (ACNES).[7] This report may help surgeons and sports medicine experts to look at the problem from a broader perspective.

Case Report

A 29-year-old high-profile professional soccer player with a body mass index (BMI) of 21 kg/m^2 was referred by the sports medicine expert because of persisting inguinal pain in spite of a 3-month vigorous treatment for osteitis pubis, and a left-sided sportsman's (inguinal) hernia was observed in magnetic resonance imaging (MRI), whereas no sign of hernia was observed at the right side. No obvious inguinal hernia existed in physical examination, but digital examination of the superficial inguinal ring was painful. Minimally invasive inguinal hernia repair was decided. A telescope port was entered 2 cm left-lateral to the umbilicus and two 5-mm ports were located at the midline. Operative findings were consistent with those of MRI. A TEP inguinal hernia repair was performed using a three-dimensional polypropylene mesh for (3DMax™ Mesh, BD, Franklin Lakes, NJ, USA) and resorbable mesh fixation (SecureStrap™, Ethicon, Puerto Rico, USA). Postoperative recovery was uneventful; however, the patient developed pain over the inguinal region 4 weeks after surgery. This pain displayed an undulant course for 6 months. Two percutaneous blocks with a 3-month interval were beneficial. Afterward, inguinal pain subsided, and the patient declared a different pain located more cranially, on the left rectus muscle between the umbilicus and the pubis. He described a difficulty in walking and standing for relatively long times; however, he managed to play during the whole soccer season. Repeated ultrasound studies did not reveal any pathology. After the soccer season, he returned to the clinic, and the most recent physical examination revealed a hypertrophic dermal scar at the 12-mm port site; also, there was a firm subcutaneous scar tissue beneath it. Palpation of this area was very painful. A surgical exploration was decided.

A 3-cm incision including a hypertrophic scar was made following local anesthesia with lidocaine. A mass formed by fibrotic dense scar tissue was reached. The dissection was deepened over the anterior sheath of the left rectus muscle. It was seen that the anterior cutaneous branch of the T10 intercostal nerve was entrapped by the scar tissue [Figure 1]. Also, the suture that had been applied with 2/0 polydioxanone in order to close the anterior fascial defect during the index surgery was completely intact without any sign of absorption after exactly 1 year, but the reason for nerve entrapment was not related with the suture itself [Figure 2]. The nerve bundle was excised by ligation, and the edge of the nerve was buried into the muscle. The scar tissue measured 40 mm × 25 mm was also totally excised [Figure 3].

The patient was free of pain immediately after surgical intervention. On the control follow-up after 1 month, he told he was much better and felt prepared for new sports season.

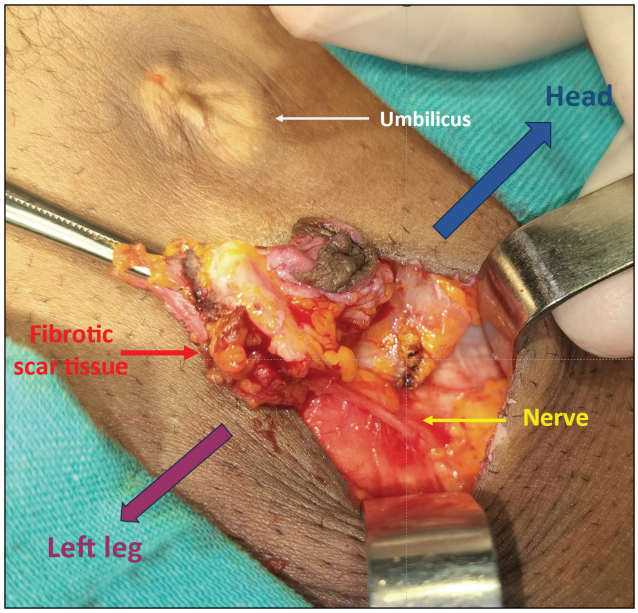

Figure 1: T10 intercostal nerve is entrapped by the fibrotic scar tissue. Yellow arrow: nerve, red arrow: mass of scar tissue, white arrow: umbilicus, blue arrow: cranial direction, violet arrow: caudal direction

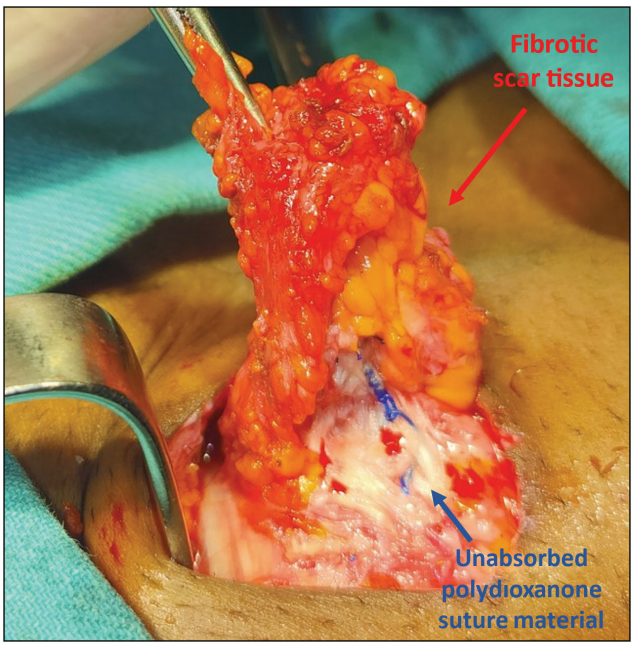

Figure 2: Unabsorbed 00 polydioxanone suture is seen beneath the fibrotic scar mass. Red arrow: mass of scar tissue, blue arrow: suture material

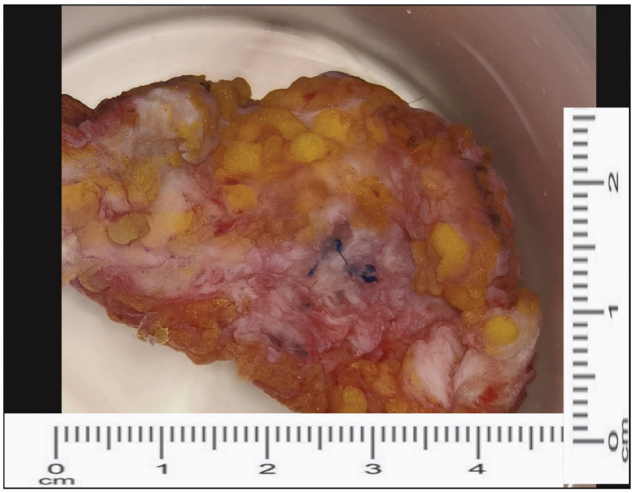

Figure 3: Dimensions of the resection material: 40 mm × 25 mm

Discussion

Chronic groin pain in sportsmen and persistent pain following inguinal hernia repair are two different conditions, but these two conditions may come together in some cases. Hernia surgery-related complications rarely cause delay in resuming sports due to persisting pain, whereas coexisting and previously diagnosed problems such as osteitis pubis or adductor tendinitis are responsible for delay in most cases. In this case, a very unusual cause of pain refrained the player to perform in full capacity. This is known as ACNES. This condition was first described in the literature 50 years ago.[7,8] Laparoscopic surgery can cause ACNES,[9] and ilioinguinal nerve entrapment is a known cause for postoperative pain following minimally invasive inguinal hernia repairs;[10] however, the location, reflection, and the specific cause of the persisting pain in the present case are different. Direct or ultrasound-guided blocks,[11] peripheral nerve stimulations,[12] lidocaine patches,[13] and pulsed radiofrequency[14] have been used for the treatment of ACNES; nevertheless, surgical neurectomy provides better pain relief in comparison with nonsurgical methods.[15] Unfortunately, the success rate of surgical intervention is not perfect, and one-third of the patients who undergo neurectomy describe persistent pain at different levels.[16,17]

The anterior divisions of the 7th–11th thoracic intercostal nerves are continued anteriorly from the intercostal spaces into the abdominal wall, and they are also called thoracoabdominal nerves. They supply the rectus abdominis muscle originating from the anterior cutaneous branches of these intercostal nerves, and the lower intercostal nerves also supply the intercostal muscles and anterior abdominal wall musculature. In case of entrapment of these anterior branches, abdominal muscular pain develops along with anterior cutaneous pain of the abdomen.[18,19] The anterior branch of the 10th thoracic intercostal nerve is met at the lateral edge of the rectus margin at the level of the umbilicus and is entrapped in this case.[20]

Entry into the extraperitoneal space by splitting the branches of the left rectus abdominis muscle lateral to the midline provides better and more direct visualization of the left inguinal region and keeps the midline intact for further surgical procedures including a prospective right inguinal hernia repair in the future. The likelihood of developing a contralateral inguinal hernia within 25-year follow-up after a unilateral repair 29.0% and the potential risk factors for a primary left-sided inguinal hernia repair and lower BMI were demonstrated.[21] Our study patient presented with these two characteristics; hence, we preferred this asymmetrical optic port entry in order to avoid a difficulty at the midline during a contralateral repair in the future. In fact, cutaneous nerves pass through the anterior rectus sheath at the lateral border of the rectus muscle,[20] and the width of the muscle at least 9 cm at the level of the umbilicus;[22,23] therefore, it is not possible to trap the nerve during port site closure only 2 cm lateral to the midline.

Obviously, there is no risk for ACNES after classical midline optic port entry during TEP repair. However, lateral port entries may match the course of the intercostal nerves. A nerve can be entrapped during fascial closure; nevertheless, no case has been described for this specific complication following TEP inguinal hernia repair. The present case was the first one to shed light on the risk to surgeons. Still, the reason for ACNES is not an entrapment with a suture, but a pressure with fibrotic scar tissue.

Conclusion

ACNES can occur after laparoscopic procedures such as inguinal hernia repairs. Lateral port entries over the rectus muscle sheath carries this risk; therefore, a classic midline entry or employment of a finer 5-mm camera device is recommended. Chronic pain in the patient can be treated surgically with excision of the involved nerve.

Author contributions

Dr. Kulacoglu: surgical procedure, manuscript design, literature search, data analysis, and manuscript writing. Dr. Alptekin: procedure, literature search, and manuscript review. Dr. Celasin: surgical procedure and manuscript review.

Ethical policy and institutional review board statement

This study is in compliance with the ethical standards of the institutional or regional human experimentation

committee and the Helsinki Declaration of 1975 (2013revision). Historical patient records were analyzed. An informed consent was taken.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Data availability statement

All data generated and/or analyzed during this study are included in this published article.

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Conflicts of interest

There are no conflicts of interest.

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Not applicable.

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